CLAIMS

What is claimed is:

1. A method of managing the transmission of data traffic from a plurality of queues, comprising:

maintaining a regular credit count and a history credit count for each of the queues;

periodically polling the history credit counts of the queues to identify candidates for arbitration, a queue being identified as a candidate if data transmission from the queue is not blocked and the queue has a history credit count greater than a first predetermined minimum value;

both periodically and upon identifying no candidates for arbitration by polling the history credit counts, polling the regular credit counts of the queues to identify candidates for arbitration, a queue being identified as a candidate if data transmission from the queue is not blocked and the queue has a regular credit count greater than a second predetermined minimum value;

upon identifying candidates for arbitration based on either the history or regular credit counts, performing arbitration among those queues identified as candidates;

periodically increasing the regular credit count or history credit count of each queue, the regular credit count for a queue being increased when data transmission from the queue is not blocked, the history credit count for a queue being increased when data transmission from the queue is blocked; and

decreasing either the regular credit count or history credit count for each queue when data is transmitted from the queue upon winning an arbitration, the history credit count being decreased when the arbitration has been won on the basis of the history

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credit count, and the regular credit count being decreased when arbitration has been won on the basis of the regular credit count.

2. A method according to claim 1, further comprising:

maintaining a shift register containing a pattern establishing the relative frequencies at which the regular credit count and the history credit count are polled;

periodically shifting the contents of the shift register; and

upon each shift of the shift register, determining based on the value of the binary digit at a predetermined position in the shift register whether to poll the history credit count or the regular credit count.

3. A method according to claim 1, wherein data transmission from the queue is determined to be blocked when the queue is either empty or is facing backpressure, and data transmission from the queue is determined not to be blocked when the queue is non-empty and is not facing backpressure.

4. A method according to claim 1, wherein the increasing of the regular credit count and history credit count of each queue occurs upon identifying no candidates during the polling of the regular credit count.

5. A method according to claim 1, wherein performing arbitration comprises performing round-robin arbitration.

6. A method according to claim 1, wherein the first predetermined minimum value is zero.

7. A method according to claim 1, wherein the second predetermined minimum value is zero.

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8. A method according to claim 1, further comprising maintaining a history credit limit for each of the queues, and wherein the history credit count for each queue is increased when data transmission from the queue is blocked and the history credit count is less than the history credit limit.

9. A method according to claim 1, further comprising maintaining a weight for each queue, and wherein the increasing of the history credit count and the regular credit count of each queue comprise increasing the credit count by the corresponding weight.

10. A method according to claim 9, wherein the weights maintained for the different queues are generally different.

11. A method according to claim 1, wherein each queue corresponds to a different output of a network device.

12. A method according to claim 1, further comprising

re-polling the regular credit count of each queue upon increasing the regular credit count and history credit count of each queue; and

upon identifying candidates for arbitration based on the re-polling of the regular credit counts, performing arbitration among those queues identified as candidates.

13. A method according to claim 12, further comprising repeating the increasing of the credit counts, the re-polling, and the conditional performing of arbitration among candidates identified based on the re-polling up to a predetermined maximum number of times.

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14. A method according to claim 1, further comprising:

polling the respective lengths of the queues if no candidates are identified upon the polling of the regular credit counts; and

upon identifying candidates for arbitration based on the polling of the queue lengths, performing arbitration among those queues identified as candidates.

15. A method according to claim 1, further comprising:

polling the queues to identify those queues containing data, if no candidates are identified upon the polling of the regular credit counts; and

upon identifying candidates for arbitration based on identifying queues containing data, performing arbitration among those queues identified as candidates.

16. A network switch, comprising:

a plurality of queues, each queue receiving data from an input of the switch and being associated with a corresponding different output of the switch, each queue including a corresponding regular credit count and history credit count;

data transfer logic operative to transfer data from a selected one of the queues to the corresponding output of the switch; and

arbitration logic operative to:

(1) periodically poll the history credit counts of the queues to identify candidates for arbitration, a queue being identified as a candidate if data transmission from the queue is not blocked and the queue has a history credit count greater than a first predetermined minimum value;

(2) both periodically and upon identifying no candidates for arbitration by polling the history credit counts, poll the regular credit counts of the queues to

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identify candidates for arbitration, a queue being identified as a candidate if data transmission from the queue is not blocked and the queue has a regular credit count greater than a second predetermined minimum value;

(3) upon identifying candidates for arbitration based on either the history or regular credit counts, perform arbitration among those queues identified as candidates;

(4) periodically increase either the regular credit count or history credit count of each queue, the regular credit count for a queue being increased when data transmission from the queue is not blocked, the history credit count for a queue being increased when data transmission from the queue is blocked; and

(5) decrease either the regular credit count or history credit count for each queue when data is transmitted from the queue upon winning an arbitration, the history credit count being decreased when the arbitration is won on the basis of the history credit count, and the regular credit count being decreased when arbitration is won on the basis of the regular credit count.

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